

I Claim:

- 1 1. Atomic layer deposition arrangement comprising:
2 an evacuable chamber,
3 at least two atomic layer deposition sources within the chamber, wherein each atomic
4 layer deposition source is isolated from the remainder of the chamber, and
5 means for conveying substrate through the evacuable chamber.
- 1 2. Atomic layer deposition arrangement according to claim 1 wherein the means for
2 conveying substrate comprises a rotatable drum.
- 1 3. Atomic layer deposition arrangement according to claim 1 further comprising a
2 grounded shield for each atomic layer deposition source.
- 1 4. Atomic layer deposition arrangement according to claim 1 further comprising a
2 substrate source chamber adjacent to the evacuable chamber.
- 1 5. Atomic layer deposition arrangement according to claim 4 wherein the substrate
2 source chamber comprises a first rotatable drum and a second rotatable drum, the first
3 rotatable drum having polymer film wrapped around the drum, wherein the polymer film is
4 conveyed into the evacuable chamber, and the second rotatable drum receives the polymer
5 film after the polymer film exits the evacuable chamber.
- 1 6. Atomic layer deposition arrangement according to claim 5 wherein the polymer film
2 comprises at least one selected from the group consisting of polyethylene terephthalate,

3 polyacrylate, polypropylene, low density polyethylene, high density polyethylene, ethylene
4 vinyl alcohol, polyphenylpropyleneoxide, polyvinylidene chloride and polyamides.

1 7. Atomic layer deposition arrangement according to claim 6 wherein the polymer film
2 comprises polyethylene terephthalate.

1 8. Method for preparing a coated substrate comprising:
2 providing an atomic layer deposition arrangement comprising an evacuable
3 chamber, at least two atomic layer deposition sources within the chamber, wherein each
4 atomic layer deposition source is isolated from the remainder of the chamber,
5 conveying substrate to the first of the at least one atomic layer deposition source,
6 exposing the substrate to the at least one atomic layer deposition source,
7 conveying the substrate to the next atomic layer deposition source, and
8 exposing the substrate to said next atomic layer deposition source.

1 9. Method for preparing a coated substrate according to claim 8 comprising conveying
2 coated substrate out of the evacuable chamber conveying substrate by rolling a rotatable
3 drum which carries the substrate.

1 10. Method for preparing a coated substrate according to claim 9 comprising conveying
2 substrate by rolling a rotatable drum which carries the substrate.

1 11. Method for preparing a coated substrate according to claim 8 wherein the substrate is
2 a polymer film.

1 12. Method for preparing a coated substrate according to claim 11 wherein the polymer
2 comprises at least one selected from the group consisting of: polyethylene terephthalate, low
3 density polyethylene, high density polyethylene, polypropylene, polycarbonate,
4 polyvinylidene chloride, ethylene vinyl alcohol, polyacrylate and polyamide.

1 13. Method for preparing a coated substrate according to claim 8 wherein the first atomic
2 layer deposition source is a source of trimethylaluminum.

1 14. Method for preparing a coated substrate according to claim 13 wherein the oxidizing
2 agent is selected from the group consisting of oxygen, nitrous oxide, and ozone.

1 15. Method for preparing a coated substrate according to claim 8 wherein the first atomic
2 layer deposition source is a source of trimethylaluminum and the next atomic layer deposition
3 source is a source of oxidizing agent.

1 16. Method for preparing a coated substrate according to claim 8 further comprising
2 providing a substrate source chamber adjacent to the evacuable chamber.

1 17. Method for forming a coated substrate according to claim 16 further comprising a first
2 rotatable drum and a second rotatable drum in the substrate source chamber, the first rotatable
3 drum having polymer film wrapped around the drum,
4 rotating the first rotatable drum and conveying polymer film into the evacuable
5 chamber, and
6 rotating the second rotatable drum and receiving polymer film exiting the evacuable
7 chamber.

1 18. Method for forming a coated substrated according to claim 8 further comprising
2 introducing an inert gas into the evacuable chamber.

1 19. Method for forming a coated substrate according to claim 8 wherein the inert gas is
2 selected from the group consisting of argon and oxygen.

1 20. Method for forming a coated substrate according to claim 8 wherein the substrate is a
2 polymer film and wherein a barrier coating which has a thickness of 400 Å to 50 Å is formed
3 on the polymer film.